

• Project Information •

Project Title	DISC Drill Test, Summit Station 2006
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Project Summary
This project is in support of the Deep Ice Sheet Coring (DISC) project in Western Antarctica. To support this project the Ice Core Drilling Services (ICDS) was tasked to develop and manufacture a new drilling system. The NSF requested that the drill system first be tested prior to deploying it to Antarctica. Summit Station, Greenland was selected as the test location.

• Background •

The National Science Foundation (NSF) tasked VPR to support the test effort at Summit Station in 2005. In March of 2005, ICDS, the researchers and NSF determined the schedule was too ambitious and the test was delayed by one year to give ICDS additional time to complete the drill design and manufacture.

VPR completed much of the site prep and infrastructure construction during the 2005 field season to give ICDS a longer drilling timeframe in 2006. VPR preparations in 2005 included erection of the drill test weatherport structure, constructing a heavy-duty floor for the structure, cutting the drill slot, constructing the generator building, and purchasing and shipping two CAT 125 generators for the project.

VPR must complete remaining work during the winter and spring of 2006 to finish the necessary site and infrastructure preparations for the project. Once ICDS personnel are on site and the drill test site has been turned over, VPR station personnel will support the daily camp operations for ICDS drill staff, fuel and maintain the drill generators, and provide additional support as needed during the field season.

• Roles & Responsibilities •

Role	Name	Email	Primary Phone
VPR DISC Project Manager	Mark Begnaud	Mark@polarfield.com	720-320-6160
Assist with project plan development and oversight	Jill Ferris	Jill@polarfield.com	303-984-1450
VPR Summit Project Manager	Sandy Starkweather	Sandy@polarfield.com	303-518-8714
VPR Greenland Logistics Manager	Robin Abbott	Robin@polarfield.com	303-748-8507
Develop/review safety plans	Jay Burnside	Jay@polarfield.com	720-320-6158
VPR Construction Foreman	Billy Texter	b_texter@yahoo.com	970-376-2025
ICDS Project Manager	Alex Shturmakov	alex.shturmakov@ssec.wisc.edu	608-265-0038
ICDS Lead Driller	Jay Johnson	jjohnson@psl.wisc.edu	608-265-0038
Professor Desert Research Institute University of Nevada	Kendrick Taylor	kendrick.taylor@dri.edu	775-673-7375
National Ice Core Lab	Geoffrey Hargreaves	ghargreaves@usgs.gov	303-202-4830
NSF Representative	Simon Stephenson	sstephen@nsf.gov	703-292-7435
Summit Science Coordinating Office Representative	John Burkhart	jburkhart@ucmerced.edu	209-658-7142

• Requirements •

1. Move 99,000 lbs of ICDS Cargo to Summit.
2. Provide power for the drill test operations.
3. Provide a structure to house the drill that is large enough for the drill to articulate.
4. Ensure the structure is ventilated to remove vapors and maintain ambient air temperature within drill structure.
5. Cut a drill slot and provide access to the bottom of the slot and railings around the slot.
6. Provide a core processing structure.
7. Provide a break structure.
8. Install the ICDS-provided MECC workshop.
9. Provide a wireless Internet link, sat phone and radios.
10. Provide first aid emergency response for the project duration.
11. Provide support for a 24-hour drilling operation.
12. Move 120,000 lbs of ICDS Cargo from Summit to NY .

• Project Constraints •

1. ICDS must have cargo to NY by March 31.
2. All DISC cargo must fit within a LC-130 aircraft for transport.
3. Construction must be completed as quickly as possible to enable the longest amount of time possible for the drill test.
4. Project must fit within NYANG flight schedule dates and availability of SAAM flights.
5. Construction must be minimized during peak station population.
6. All construction and drill test activities must work within Summit's pedestrian culture whenever possible.

• Execution Plan •

VPR Construction Staffing and Schedule

VPR will provide two electricians and four carpenters dedicated to the project. The foreman and additional construction personnel will support other tasking as needed.

The foreman and one carpenter will arrive in Kangerlussuaq on April 5th to:

- Build insulated weatherport floor sections for the ICDS break and NICL weatherports.
- Test fit weatherports to be assembled at Summit.
- Prepare construction cargo for shipping to Summit.
- Assist with air force pallet construction.

On April 18th the additional construction staff will arrive in Kangerlussuaq, and all construction personnel will fly to Summit on April 20th. Construction personnel will leave Summit when the DISC site prep is complete; no later than the May 21st flight period.

VPR Summit Station Staffing and Support

VPR will supplement the traditional summer station staff of seven with 2-3 additional personnel to support the DISC project. These additional positions consist of a second cook, a second mechanic and possibly a cook's assistant.

The station crew will establish a schedule to support the drill team's plan for 24-hour operations consisting of two 12-hour shifts. While the majority of station personnel will remain on a normal workday, a mechanic will be on a night shift schedule to support DISC requirements. Additional personnel may be placed on night shift if VPR determines that this support is needed.

The Summit Station Manager will be the ICDS Point of Contact for all operational, construction and maintenance issues and/or requests.

The meals schedule will be based on a typical scenario for supporting shift work in field camps:

Breakfast – all personnel fix their own meal.
Lunch – set hours - VPR Chef prepares meal.
Dinner - set hours - VPR Chef prepares meal.
Night shift – staff heat food left by Chef.

As always there will be plenty of food available for personnel to access during non-meal times.

VPR will recruit a paramedic, trauma nurse or physician's assistant (medical officer) for DISC drill test operations between May and August. This person will wear a pager, be on-call 24/7 for medical emergency response, and will take the lead on all medical emergency response situations. The VPR station crew will form an emergency response team to support emergency response situations under the guidance of the medical officer and the station manager.

ICDS Personnel and Schedule

Initially, four ICDS personnel will join the VPR construction crew and fly to Summit on April 20th to receive the ICDS cargo, and to begin uncrating and assembling the drill equipment. Seven more ICDS personnel will arrive at Summit on May 8th to begin drilling operations. During the June 11th flight period, two drill team members will be replaced with two new ICDS drillers.

Drilling operations at Summit will be completed no later than the July 23rd flight period. At this time the ICDS drill components, structures and dedicated electrical items will be disassembled and crated for shipment to Kangerlussuaq. Everything that must leave Summit will be shipped on or before the August 14th flight period.

All ICDS personnel will depart Summit during the August 14th flight period and will return to NY on August 19th.

Cargo Movement

ICDS has 99,000 pounds of cargo that is required at Summit for the drill test. This will require 23 military pallet positions. VPR determined that a C-5 would be the most efficient aircraft for transporting the cargo quickly.

ICDS will truck their cargo to Stratton Air Base in Scotia, NY no later than March 31st. ICDS must complete all customs paperwork for the cargo prior to shipping.

VPR will SAAM a C-5 on April 17th to move the cargo from Stratton to Kangerlussuaq. The cargo will be unloaded in Kangerlussuaq and then shipped to Summit Station via LC-130 aircraft between April 17-29.

ICDS will have a few hundred pounds of additional last minute cargo that will be shipped to Stratton in late April and sent to Greenland in early May.

At the close of the season VPR will SAAM another C-5 aircraft to move the ICDS cargo back to the US. This flight is planned for August 23rd, and the airport of arrival has not yet been determined.

See the appendices for a prioritized cargo list from ICDS as well as a 109th flight schedule.

Power System

In 2005 VPR built a generator building (shack) and purchased and shipped two 125 CAT generators for the project. Power system tasks to be completed by VPR personnel in late April and early May include:

- Install the 125 generators in the generator shack.
- Distribute electrical power from the drill structure to the drilling equipment and drill tent service power, NICL w/port, MECC, ICDS break w/port and Generator shack service loads.

The VPR station mechanic will maintain and keep the generators fueled for the duration of the Summit drill test. Detailed electrical specifications are provided in Appendices.

Drill Structure

In 2005 VPR purchased and constructed a weatherport, constructed a wooden floor inside the structure, and completed initial electrical wiring of the structure. Drill structure tasks to be completed in late April and early May include:

- Remove interior scaffolding supporting the roll up doors and end walls.
- Modify south end wall to accept the NICL weatherport. The NICL weatherport will marry up with the drill tent "end to end" so core can be easily moved from the drilling structure to the quality inspection area in the NICL weatherport. Replace existing soft doors with more robust design.
- Cut the exterior blankets as required to fit the 6 each ventilation fans, framing and ducting along the exterior walls.
- Install intake ducting in the 4' square framed openings, above the roll up doors on the end walls. These ducts will be made onsite, out of lumber and plywood.
- Make a penetration through the snow, approx 12" in diameter running from outside the gantry crane rail to the inside winch pit area, to provide access for electrical feeders to run under the gantry crane rails and ventilation duct.

Ventilation System

To remove vapors and maintain ambient air temperature within the drill structure and slot, the electricians and construction personnel will complete the following tasks starting late April:

- Install and wire six each 120V ventilation fans and associated duct work on the long side of the drill tent to exhaust drilling fluid vapor to the outside of the structure.
- Install one exhaust fan and duct in the bottom of the drill slot to draw the vapor up and out of the structure.
- Fabricate ducting and install it in the 4' square opening above the roll up end doors to bring in the required fresh air for the HVAC system. These will be made on site out of lumber and plywood.

Refer to the drill tent layout drawing in the Appendices for locations and details.

Drill Slot

In 2005 VPR cut and prepared the drill slot and winch pad. In late April, VPR and ICDS personnel will coordinate to measure the depth of the drill slot and winch pad area. If winter settling has caused the required measurement of 30'2" to bottom of slot and 5'8" to bottom of winch to decrease, VPR personnel will re-cut the slot and winch pad to the required depths.

In early May, VPR will install a guardrail around the slot and winch pit area in accordance with International Building Code (IBC) and OSHA requirements.

Additional Structures

In late April, construction personnel will erect two weatherports. The first weatherport will be used by NICL for core processing. VPR will wire the weatherport and provide tables, chairs, and wireless Internet access. Their structure will be set up adjacent to the drill tent for easy access to core processing.

The second weatherport will be used by ICDS for a break and changing room for the drillers. VPR will wire the structure, heat it, provide coffee/hot water supplies, a microwave, tables and chairs, and wireless Internet access. VPR will also install an outhouse near the other drill test facilities.

MECC Installation

ICDS will send a portable structure called a MECC to use as a workshop. The structure will arrive pre-wired and completely outfitted. In late April, VPR will prepare a snow pad surface on which to place the MECC. Once the MECC is positioned, a VPR electrician will bring power to the structure in early May.

• Outyear Plans •

The Summit Station drill test project is scheduled for completion in August 2006. NSF has no plans for outyear support.

• Risk Assessment •

Risk	Prevention/Mitigation
Summit Station opening delayed	<ul style="list-style-type: none"> - Build slack into the schedule. - If schedule is delayed too long provide additional staff to assist with site preparations. - Delay the ending date for the field season.
Electrical failure	<ul style="list-style-type: none"> - Provide back-up generator in case of generator failure. - Provide on going preventative maintenance to the generators during the field season.
Mishap on or around drill including fall or drill fluid exposure	<ul style="list-style-type: none"> - Provide initial and on-going safety training and protocols to the drill team. - Provide safety equipment and require drilling team to wear and use at all times. - Designate a safety person during all shifts to watch over operations. - Provide advanced medical person on-site/on-call to deal with medical emergencies. - Have safety and medical equipment near drilling operations - Conduct initial and on-going response training for support staff to deal with emergencies.
Fall into drill slot	<ul style="list-style-type: none"> - ICDS purchase fall arrest equipment, train staff, and require staff to use at all times during operations. - VPR purchase fall arrest equipment, train staff, and require staff to use at all times during operations.

• Close-Out •

To be completed at end of season.

• Appendices •

Outstanding Issues

Issue	Responsibility	Date Completed
Determine airport of departure and destination of northbound cargo required in Greenland.	VPR	Due by 12 Feb
Determine stateside arrival airport of southbound cargo.	VPR/ICDS	Due by 1 May
Complete health and safety plans.	VPR/ICDS	Due by 15 March
Find out from the NSF if the test is a go.	NSF	Due Now
Review plan with SCO	VPR	

Allocations/Procurements

Item
2 ea. 75 KVA 480V Delta to 208/120V Wye transformer
250 MCM, 4-C, MC cable, 200' long, to provide power from generators to transfer switch and from the transfer switch to the 480 volt I-line panel
I-line breaker panel that will provide 10 each, 3 phase breaker positions and additional breakers
8-4 SO cord, 150', to provide power from 208/120v panel board to the 6 position load center in the generator shack
Ventilation fans and ducting
Plywood, lumber and fasteners
Frame for NICL 15' x 30' w/port
General construction supplies
General electrical supplies
Additional tables and chairs
Microwave

Greenland/Summit Calendars

The current Greenland calendar, including the NYANG flight schedule, is located at:
http://www.trumba.com/calendars/greenland_calendar.

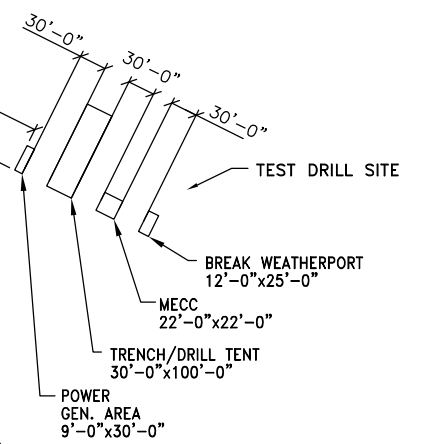
A current Summit-specific calendar is available at:
http://www.trumba.com/calendars/summit_schedule

ID	Task Name	Duration	Start	Finish	Mar	Apr	May	Jun	Jul	Aug	Sep
1	DISC Drill Test 2006	140 days	Mon 4/3/06	Thu 8/24/06							
2	Pack and ship DISC equipment to NY	2 wks	Mon 4/3/06	Fri 4/14/06							
3	VPR Construction to Kanger	1 day	Wed 4/5/06	Wed 4/5/06							
4	VPR prefab & Stage in Kanger	10 days	Thu 4/6/06	Wed 4/19/06							
5	SAAM Flight Northbound NY > Kanger	1 day	Mon 4/17/06	Mon 4/17/06							
6	DISC Equipment to Summit	11 days	Tue 4/18/06	Fri 4/28/06							
7	VPR Construction/ DISC Personnel to Summit	1 day	Thu 4/20/06	Thu 4/20/06							
8	DISC Infrastructure construction	33 days	Fri 4/21/06	Tue 5/23/06							
9	Additional DISC members arrive Summit	1 day	Mon 5/8/06	Mon 5/8/06							
10	VPR Construction redeploy to CONUS	1 day	Thu 5/25/06	Thu 5/25/06							
11	Drilling operations	65 days	Wed 5/24/06	Thu 7/27/06							
12	Drill and infrastructure disassembly	17 days	Fri 7/28/06	Sun 8/13/06							
13	DISC equipment redeploy to Kanger	5 days	Mon 8/14/06	Fri 8/18/06							
14	SAAM Flight equipment Kanger > CONUS	1 day	Thu 8/24/06	Thu 8/24/06							
15	Drill test complete	0 days	Thu 8/24/06	Thu 8/24/06							

Project: DISC Test 2006 Date: Mon 1/23/06	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

SUMMIT CAMP, GREENLAND CAMP LAYOUT

MAGNETIC DECLINATION
33 DEGREES WEST



DMI WX STATION

SUMMER 2003
TENT AREA

AIRCRAFT
REFUELING
AREA

C-130 (159' DIA)
TURNING RADIUS = 79.5'

WINTER CARGO
O (2003-2004)

SUMMER
2003
SNOW
MINE

- NOTES:**
- 1) MAP LOCATIONS VERIFIED BY JULY 2000 FIELD SURVEY.
 - 2) LOCATION OF SUMMER TENT AREA AND SUMMER SNOWLINE MAY VARY FROM SEASON TO SEASON.
 - 3) ALL GPS COORDINATES (LAT/LONG) HAVE AN ACCURACY OF +/- 10 FEET.
 - 4) AGL REFERS TO ABOVE GROUND LEVEL HEIGHT (ALL IN FEET).
 - 5) LOCAL MAGNETIC DECLINATION 33 DEGREES WEST OF TRUE NORTH. TO CONVERT TO MAGNETIC NORTH ADD 33 DEGREES TO TRUE BEARINGS AND AZIMUTHS.
 - 6) DRAWING UPDATED OCTOBER 2004.

GISP 2 BORE HOLE
72° 34' 44" N
38° 27' 35" W

15' RADIUS BURIED DOME

RADIATION STATION

SCIENCE VAULT

GUY WIRE ANCHORS

EXPOSED CABLE

2-4" VENTS

AIR SAMPLING WIRES

HF ANTENNA

SWISS WX PORT

BURIED CABLE

SEWER LINE

FRESHIE SHACK

OUTHOUSE

POWER POLE (STANDBY GENERATOR PLUG IN)

FOOD FREEZER

HF ANTENNA

"BIG HOUSE"

HF TIE-OFF

POWER LINE

50' COMMS TOWER

"BERTHING MODULE"

"GREENHOUSE"

100KW STANDBY GENERATOR

SHOP/POWER PLANT /SNOWMELTER STORAGE CONTAINERS

POWER POLE (EQPT. PLUG-IN)

BURIED POWER/FUEL LINE

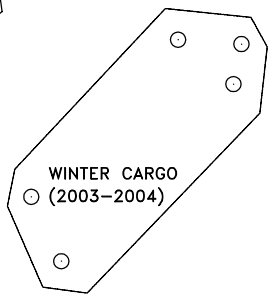
ELEVATED FUEL BERM

RAMAS

SEWER OUTFALL

SEWER OUTFALL

UTILITY LINE



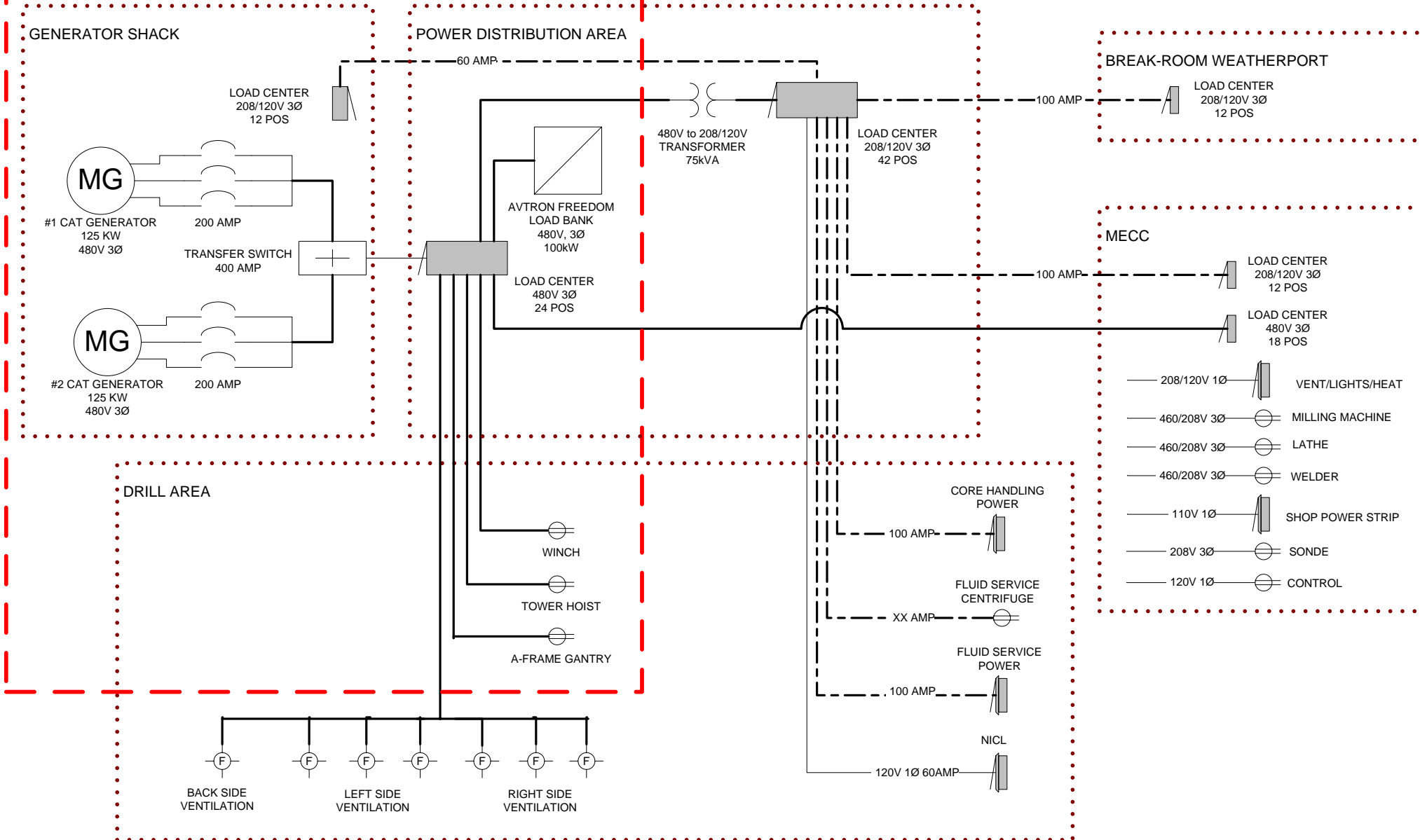
REV.	DESCRIPTION	DATE	BY	CHK'D	ENG	DISC	PRJ	ENGINEERING REVIEW			REFERENCE DRAWINGS		
								DISCIPLINE	REVIEWED	DATE	NO.	DESCRIPTION	

NATIONAL SCIENCE FOUNDATION
OFFICE OF POLAR PROGRAMS
WASHINGTON, D.C. NSF
CONTRACT DPP. 0001041

GREENLAND
SUMMIT CAMP SITE PLAN - TEST DRILL SITE
SUMMIT CAMP DRILL

CLIENT No.:	CLIENT APPR.:	APPR. DATE:
VECO No.:	SCALE: 1"=100'	CREATION DATE:
DRAWN BY: JS/LR	DWG. No.:	SHEET No. OF
SummitCamp_DRILL		1 OF 1

MADISON TEST



ASSUMPTIONS:

1. NEW EQUIPMENT WILL BE 208/3P
2. OLDER EQUIPMENT THAT REQUIRES 240/3P WILL HAVE LOCAL TRANSFORMER
3. HEATERS LOW-WATT DENSITY TYPE
4. CAB-TIRE CORDAGE (LISTED FOR EXTRA-HARD USAGE)
5. WIRE SPECS TBD AS PER LOAD
6. CONNECTOR SPECS TBD AS PER WIRE SPECS
7. "EQUIPMENT" CONNECTIONS MUST HAVE LOCAL DISCONNECT
8. EVERYTHING ON THIS SHEET IS PROVIDED TO THE DISC DRILL SYSTEM

QUESTIONS:

1. GROUND REFERENCE
2. SURGE PROTECTION
3. FIRE SUPPRESSION

TO FIND OUT

1. HEAT RECOVERY
2. WATER GENERATION

DISC DRILL SYSTEM ONE-LINE DIAGRAM GREENLAND

GRE 12/10/04

DISC Drill 2006 Greenland Cargo Estimates going from Madison, WI to Summit Station, Greenland						Priority column added	
Pallet count	Priority					Total Weight	Cubic Feet
6	2	Winch				27,000 lbs	
(3) T-2 pallets		Contents:					
		2 pallets	Winch drum	10' x 6'	6,600 lbs		
			Cable	3,800 meters	7,900 lbs		
		2 pallets	Level wind	12' x 6'	4,000 lbs		
		2 pallets	Motor base	10' x 3'	6,000 lbs		
			Miscellaneous		2,500 lbs		
3	6	Shipping Container		8' x 8'-6" x 20'		19,000 lbs	1360 CF
(1) T-3 pallet		Contents:					
			1 Container		6,000 lbs		
			3 Sondes				
			*core barrels				
			*screens				
			*motor sections				
			*upper sondes				
			*instrument sections		3,500 lbs		
			*miscellaneous drill parts	**cutters			
				**drill heads			
			1 Actuator				
			1 Gantry yellow channel				
			4 Struts (tower base)				
			Spare parts & hardware				
1	5	Tower				3,000 lbs	
		Contents:	Trusses				
			Core transfer table				
1	4	Base Legs				2,000 lbs	
Pallet count						Total Weight	Cubic Feet
1	3	Base Center & Crown Sheave & Reaction Sheave				2,000 lbs	
1	7	Hydraulic Power Unit				1,100 lbs	
		Contents:					
			1 Power unit		600 lbs		
			1 Welded frame		500 lbs		
3	1	MECC		8'x8'x20'		19,000 lbs	1,280 CF
(1) T-3 pallet							
1	10	Control Room				3,000 lbs	
1	11	Centrifuge Frame & Fluid Handling Equipment				1,000 lbs	
1	12	Control Room Equipment (DNF)				1,000 lbs	
		Contents:					
			Electronics	**computers			
				**Hardigg rack			
				**monitors			
				**cables/keyboards			
3	9	Gantry				7,000 lbs	
		Contents:					
		1 pallet	Aluminum split frame				wheel motors on either pallet
		1 pallet	Steel I-beams, track, lumber				
		1 pallet	Hoists				
1	8	Winch Control Cabinet & Miscellaneous Items				1,500 lbs	
		Contents:					
			1 Control cabinet		1,000 lbs		
			Miscellaneous items		500 lbs.		
Estimated Shipping Weight:						86,600 lbs	
Add 15% weight for shipping materials and contingency:						13,000 lbs	
Total estimated shipping weight:						99,600 lbs	
Total Estimated Pallets:						23 pallets	